FRD Activities Report
July 2002

Research Programs

CBLAST-High

The data system was re-packaged and final testing was completed on the BAT gust probe package to be installed on the NOAA P3 (N43RF) for the upcoming hurricane season. The data system utilizes real-time linux, a significant upgrade to the DOS-based software we have running on other systems. Calibration of the sea-surface temperature sensor revealed the instrument was damaged. Repair work was performed by Everest Interscience Inc., maker of the unit. At the end of July, the entire measurement package was shipped to AOC in Tampa, and is awaiting install and test flights scheduled for early August. (Jeff.French@noaa.gov and Tim Crawford)

CBLAST-Low

Final preparations have been made for Coupled Boundary Layers Air-Sea Transfer light wind (CBLAST-Low) field study. Two test flights were conducted with the LongEZ research aircraft on July 15 and 17, 2002. The first flight was dedicated to testing the various *in situ* and remote sensors as well as the data acquisition system. The second flight was reserved for calibration maneuvers to determine the proper coefficients for wind velocity determination. All of the equipment was shipped on July 25, 2002 to Hyannis, Massachusetts where the LongEZ will be based during CBLAST-Low. The first probable flight day for the LongEZ is scheduled for August 1, 2002 with the last day on August 28, 2002. (Jerry.Crescenti@noaa.gov, Jeff French, and Tim Crawford)

Refractive Turbulence

Upgrades to the electronics package for three BAT spheres to be flown on the Australian Egrett have been performed. Careful calibrations were conducted for the pressure, accelerometer, and temperature sensors. The spheres are packaged and await shipment to Australia. They will be flown in August and September as part of the high-altitude refractive turbulence study that will be conducted in collaboration with Jörg Hacker (Airborne Research Australia) and Owen Cotè (Air Force Research Laboratory). (Tim.Crawford@noaa.gov, and Jeff French)

ET Probe

Preparations continue for deployment of three ET probes during this hurricane season, with most of the action now focused at ATDD in Oak Ridge. FRD is planning to send two additional notebook computers to ATDD for use with the second and third probes. A fourth probe has been assembled at FRD for testing purposes. One planned activity with this probe is to set it up on a windy day next to FRD's flux station at INEEL and compare the probe wind and turbulence data

with those from the flux station's sonic anemometer. (Richard.Eckman@noaa.gov, Tom Strong, Ron Dobosy and Dave Auble [ATDD])

IMS Development Project

During the month of July, the original funding for this project was exhausted and additional funding was received from DTRA. This combined with the holiday break interrupted development efforts for about two weeks. However, we were able to make progress in a couple of areas. First, we were able to finally get the aperture to work correctly, which significantly increased the resolution of the IMS prototype. This enabled us to better identify the contaminate peaks in the ion spectrum. One appears to be associated with the label on the Polonium ionization source. We were able to eliminate most of this peak by covering the label and redesigning the drift cell. This allowed us to see 155 ppb of SF6 (See Figure 1). The other peak appears to be chloride and we are working with manufacturers of the adhesives used in the IMS to identify the source of this so it may be eliminated. (Roger.Carter@noaa.gov, Shane Beard, Debbie Lacroix)

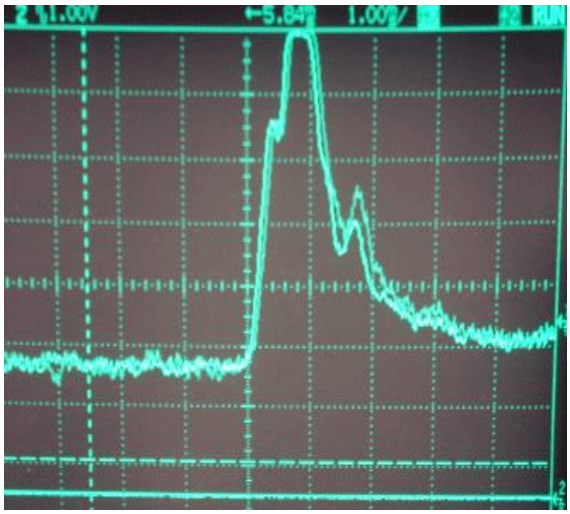

Figure 1. Upper IMS spectrum is 155 ppb SF6. Lower spectrum is air. SF6 is the small peak to the right of the main peak.

Hurricane Balloon

Three transponders were tested and prepared for packing and ultimate deployment to the path of a hurricane off the west coast of Mexico or to South Point on the island of Hawaii. Permission has not yet been received to operate in Mexico. We hope to receive word on this status in August and to receive permission to deploy to Mexico, in event of a likely hurricane, by the middle of August or early September of 2002. (Randy.Johnson@noaa.gov, Shane Beard, Roger Carter)

Cooperative Research with INEEL

Emergency Operations Center (EOC)

INEEL Support

Momentum appears to be building to upgrade the dispersion modeling that FRD performs to support INEEL operations. The modeling is currently based on the venerable MDIFF puff model, which can provide results quickly but also lacks several features (e.g., deposition, radiological algorithms, terrain adjustments) that would be useful in supporting INEEL. DOE is now beginning to allocate funding for the upgrade process. A small amount of money has been provided in FY 2002, and it is hoped that some additional funding will be provided in the

following years. If possible, FRD intends to adapt an existing dispersion model for use at INEEL rather than building a new one from scratch. (Richard.Eckman@noaa.gov, Kirk Clawson)

INEEL Wildfire Modeling

The current wildfire modeling capabilities at FRD are fairly primitive, and some effort was expended in July on determining how the modeling could be improved. Ideally, FRD would like to provide estimates of current INEEL fire weather conditions based on data from the Mesonet, and also provide forecast fire weather conditions based on the MM5 modeling. Fuel models are available that provide a reasonable representation of the vegetation at INEEL, so the main problem associated with estimating fire weather conditions is in calculating fuel moisture. Measurements of fuel moisture are available at a WIMS (Weather Information Management System) station operated by the Department of Agriculture in Arco, Idaho, but the most recent measurements are from 1400 LST on the previous day. What is needed is an algorithm that can extrapolate the measured fuel moisture forward in time using standard meteorological observations of wind, temperature, etc. (Richard.Eckman@noaa.gov)

INEEL Mesoscale Modeling

A dual processor Dell workstation with two Intel Xeon processors was ordered in July as an eventual replacement for the balky Alpha workstation that is currently used for MM5 modeling at FRD. The new computer will run the Linux operating system and use the recently released Intel FORTRAN 90/95 compiler to compile the MM5 source code. The intention is to keep the Alpha workstation running (as long as it lasts) as a testbed for alternate configurations of MM5. There are clearly some systematic biases in the current MM5 runs at FRD, particularly in relation to daytime humidity and near-surface wind speeds, and the hope is to mitigate these problems by adjusting the MM5 configuration. (Richard.Eckman@noaa.gov)

The MM5 forecasts at FRD are currently being initialized with output from the NCEP Eta model. Up until July, an ftp server maintained by the NWS was being used to download the Eta files necessary for initializing MM5. This server is maintained on a 7/24 basis, and should therefore be reliable. Unfortunately, this is not the case. Required Eta-model files were frequently missing or late to show up on the server, which caused significant delays or failures in the MM5 runs. The required Eta-model files are now being obtained from an NCEP server which is a little slow but significantly more reliable. (Richard.Eckman@noaa.gov)

Other Activities

AirVenture 2002

Tim Crawford showcased the LongEZ research aircraft at AirVenture 2002 in Oshkosh, Wisconsin, July 23-29, 2002. This was the Experimental Aircraft Association's 50th airshow,

and about 750,000 people observed the many exhibits and the 2500 show planes and aerial shows.
New technologies and aircraft were showcased during the seven day event.. NOAA had an exhibit in the Federal Pavilion featuring the LongEZ and its capabilities as a Small Experimental Research Aircraft (SERA). Among the popular handouts were the NOAA OAR/UCAR/JOSS booklet titled "Reports to the Nation, Our Changing Climate, and a paper fold up model of the LongEZ. Tim Crawford, Ed Dumas and Chris Schamper participated in the NOAA educational display. The OAR Outreach Committee were gracious enough to pay travel expenses for Tim Crawford, Ed Dumas and Chris Schamper. (Tim.Crawford@noaa.gov, Jerry Crescenti and staff)

Figure 2. Tim Crawford, Chris Schamper and Ed Dumas at the NOAA Exhibit for AirVenture 2002.

Papers

Crescenti, G. H., T. K. Grimmett, T. L. Crawford, and J. R. French, 2003: Vertical structure of the marine atmospheric boundary layer near Martha's Vineyard. *12th Conference on Interactions of the Sea and Atmosphere*, Long Beach, CA, Feb. 9-13. Amer. Meteor. Soc., abstract submitted.

Grimmett, T. K., G. H. Crescenti, T. L. Crawford, and D. C. Vandemark, 2003: Study of drag coefficient as a function of atmospheric turbulence and ocean wave state. *12th Conference on Interactions of the Sea and Atmosphere*, Long Beach, CA, Feb. 9-13. Amer. Meteor. Soc., abstract submitted.

Travel

Tim Crawford to Seattle July 7 and 8 for CAMS Program Manager Training.

Kirk Clawson to Washington, D. C. July 8 through July 11 for Urban Dispersal Model Working Group Meeting.

Jeff French to University of Wyoming July 9 through July 11 for discussion with Dr.'s Gabor Vali and Jefferson Snider for plans to utilize the Wyoming King Air and cloud radar in the upcoming Rain In Cumulus over the Ocean (RICO) Experiment, Fall 2003. Also Jeff participated as a committee member in the PhD Dissertation Defense by Swarndeep Gill, a graduate student at Wyoming.

Tim Crawford began travel on July 19, 2002 to Oshkosh, Wisconsin to showcase the LongEZ research aircraft at AirVenture 2002 sponsored by the Experimental Aircraft Association (EAA). Tim Crawford then continued his travel on July 30, 2002 to Hyannis, Massachusetts to conduct the CBLAST-Low field study.

Jerry Crescenti began travel on July 27, 2002 to Hyannis, Massachusetts to begin the 5-week long CBLAST-Low field study.

Jeff French began travel on July 29, 2002 to Hyannis, Massachusetts to help with set up of the CBLAST-Low field study.

Safety

The Regional Safety Manager (RSM) and the Regional Environmental Compliance Officer (RECO) from MASC arrived on July 17th for an assistance visit. The assistance visit was an informal meeting for them to discuss FRD safety and environmental compliance issues and to get acquainted with the facility and the employees. They toured the facility and provided advice on safety and environmental compliance issues. A report will be provided of observations and recommendations. (debbie@noaa.inel.gov)

Jerry Crescenti provided the safety officer with a list of possible hazardous materials for the CBlast-Low project. MSDS's were gathered for all materials; gloves and eye protection were provided and the appropriate shipping papers were prepared for only those materials classified as hazardous by the Department of Transportation (DOT). (debbie@ noaa.inel.gov)

Training

Tim Crawford attended the CAMS Program Manager Training course in Seattle on July 7 and 8. Use of the CAMS programs and changes in procedure were discussed.

Fire extinguisher training was given to all employees on July 18th. A video was presented and some employees used the opportunity for hands-on training by using some extinguishers to put out a gas fire.

Visitors

An Idaho Falls Fire Inspector, Scott Criddle, inspected the warehouse, compound and office areas on July 18, 2002.

Rhonda Carpenter, the MASC Regional Safety Manager (RSM) and Mark George, the Regional Environmental Compliance Officer (RECO) arrived for an assistance visit on July 17th.